

MATEMÁTICA

01 Letra C.

$$\Delta < 0$$

$$m^2 - 12 < 0 \Rightarrow -2\sqrt{3} < m < 2\sqrt{3}$$

02 Letra D.

$$t = 0 \rightarrow f = 10^4$$

$$10^4 = a \cdot b^0 \therefore \boxed{a = 10^4}$$

$$t = 3 \rightarrow f = 8 \cdot 10^4$$

$$8 \cdot 10^4 = 10^4 \cdot b^3 \therefore b^3 = 8 \therefore \boxed{b = 2}$$

$$f(t) = 10^4 \cdot 2^t$$

$$t = 30 \text{min} = 1/2 \text{hora} \rightarrow f = ?$$

$$f = 10^4 \cdot 2^{1/2} = 10^4 \times 1,41 = 14100$$

03 Letra E.

$$\text{Valor final} = \text{valor inicial} (1 + i)^n$$

$$18000 = 6000 \cdot (1 + 0,2)^n$$

$$3 = 1,2^n$$

$$\log 3 = n \cdot \log 1,2$$

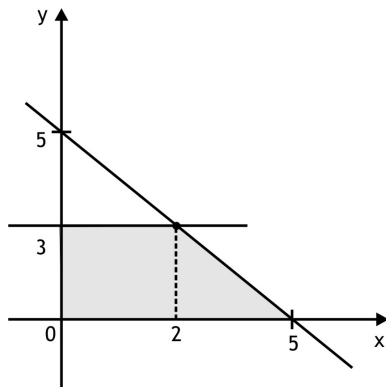
$$n = \frac{\log 3}{\log 1,2} = \frac{\log 3}{\log 12 - \log 10} = \frac{\log 3}{2 \log 2 + \log 3 - \log 10}$$

$$n = \frac{0,48}{2 \times 0,30 + 0,48 - 1} = \frac{0,48}{0,08} = 6 \text{ anos}$$

$$6 \text{ anos após } 1996 \Rightarrow 2002$$

04 Letra B.

$$y \leq 5 - x$$



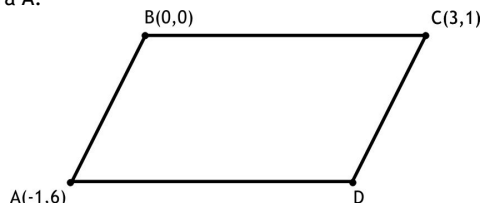
$$A = \frac{5+2}{2} \cdot 3 \therefore \boxed{A = 10,5}$$

05 Letra B.

$$m_{AB} = \frac{6-4}{3-(-1)} = \frac{1}{2}$$

$$\boxed{m_r = -2}$$

06 Letra A.



$$\overline{AB} = \overline{DC}$$

$$B - A = C - D \therefore \boxed{D = A + C - B}$$

$$D = (-1,6) + (3,1) - (0,0) \therefore \boxed{D = (2,7)}$$

07 Letra A.

Equação da reta r:

$$\frac{x}{1} + \frac{y}{3} = 1 \therefore y = -3x + 3$$

Equação da reta s:

$$\frac{x}{-2} + \frac{y}{3} = 1 \therefore y = \frac{3}{2}x + 3$$

A região é descrita por:

$$y \leq -3x + 3; y \leq \frac{3}{2}x + 3 \text{ e } y \geq 0$$

08 Letra C.

I - Verdadeiro.

II - Verdadeiro.

III - Falso: $m = -\frac{b}{a}$.

IV - Verdadeiro.

09 Letra A.

$$10^{x^2-3} = 10^{-2}$$

$$x^2 - 3 = -2 \therefore x^2 = 1 \therefore \boxed{x = \pm 1}$$

10 Letra D.

$$2^{2x+2y} = 2^5 \therefore 2x + 2y = 5$$

$$3^{y-x} = 3^{1/2} \therefore y - x = 1/2$$

$$\begin{cases} 2x + 2y = 5 \\ y - x = 1/2 \therefore x = y - 1/2 \end{cases}$$

$$2(y - 1/2) + 2y = 5$$

$$4y = 6 \therefore \boxed{y = 3/2} \rightarrow x = \frac{3}{2} - \frac{1}{2} \therefore \boxed{x = 1}$$

(1; 3/2)

11 Letra D.

$$\log_2(x-2) - \frac{\log_2 x}{2} = 1$$

$$2 \log_2(x-2) - \log_2 x = 2$$

$$\log_2^2 \frac{(x-2)^2}{x} = 2$$

$$\frac{(x-2)^2}{x} = 4 \therefore x^2 - 4x + 4 = 4x$$

$$x^2 - 8x + 4 = 0$$

$$\Delta = (-8)^2 - 4(1)(4) = 64 - 16 = 48$$

$$x = \frac{8 \pm 4\sqrt{3}}{2} = 4 \pm 2\sqrt{3}$$

$$\text{Como } x > 2 \rightarrow x = 4 + 2\sqrt{3}$$

12 Letra C.

$$2A = A \cdot 1,28^t$$

$$2 = 1,28^t$$

$$\log 2 = t \cdot \log 1,28$$

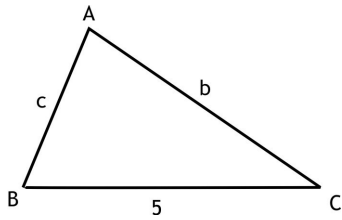
$$t = \frac{\log 2}{\log 1,28} = \frac{\log 2}{7 \log 2 - \log 100} =$$

$$= \frac{0,30}{7 \times 0,30 - 2} = \frac{0,30}{0,10} = 3$$

13 Letra E.

$$\log 195 = \log(3 \times 5 \times 13) = \log 3 + \log 5 + \log 13 = \log 15 + \log 13 = 1,176 + 1,114 = 2,290$$

14 Letra E.



$$\frac{a}{\sin \hat{A}} = \frac{c}{\sin \hat{C}} \therefore C = \frac{a \cdot \sin \hat{A}}{\sin \hat{C}}$$

$$C = \frac{5 \cdot \frac{2}{\sqrt{5}}}{4/5} = \frac{5\sqrt{5}}{2}$$

$$5^2 = b^2 + \left(\frac{5\sqrt{5}}{2}\right)^2 - 2 \cdot b \cdot \frac{5\sqrt{5}}{2} \cdot \cos \hat{A}$$

$$b = \frac{5\sqrt{5}}{2} \text{ (\Delta acutângulo)}$$

$$b = \frac{\sqrt{5}}{2} \text{ (\Delta obtusângulo)}$$

$$\frac{a}{\sin A} = 2R \therefore R = \frac{25}{8}$$

$$S = \frac{abc}{4R} = \frac{5 \cdot \frac{5\sqrt{5}}{2} \cdot \frac{5\sqrt{5}}{2}}{4 \cdot \frac{25}{8}}$$

$$S = \frac{25}{2}$$

15 Letra D.

$$A = 4x \frac{\cos a \times \sin b}{2} + 2x \sin a \times \cos b$$

$$A = 2 \sin a \cdot \cos b + 2 \sin b \cos a$$

$$A = 2 \cdot \sin(a + b) = 2 \sin \frac{\pi}{6} = 2 \times \frac{1}{2}$$

$$A = 1$$

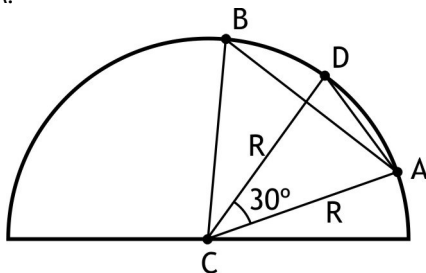
16 Letra B.

$$\cos x \cdot \cos y - \sin x \cdot \sin y = \frac{1}{2}$$

$$\cos(x + y) = \frac{1}{2}$$

$$x + y = \frac{\pi}{3} \text{ ou } x + y = \frac{5\pi}{3}$$

17 Letra A.

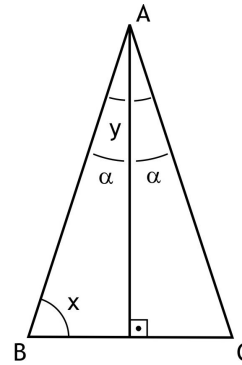


$$\overline{AD}^2 = R^2 + R^2 - 2 \cdot R \cdot R \cdot \cos 30^\circ$$

$$\overline{AD}^2 = 2R^2 - R^2\sqrt{3} = R^2(2 - \sqrt{3})$$

$$\overline{AD} = R\sqrt{2 - \sqrt{3}}$$

18 Letra D.



x e α são complementares; então, $\sin x = \cos \alpha$.

$$\sin x = \frac{3}{4} \Rightarrow \cos \alpha = \frac{3}{4}$$

$$\text{Se } \cos \alpha = \frac{3}{4}, \text{ então } \sin \alpha = \frac{\sqrt{7}}{4}$$

$$\cos y = \cos(2\alpha) = \cos^2 \alpha - \sin^2 \alpha =$$

$$\frac{9}{16} - \frac{7}{16} = \frac{1}{8}$$

19 Letra E.

$$2 \sin x \cdot \cos x = \sin x$$

$$\sin x \cdot (2 \cos x - 1) = 0$$

$$\sin x = 0 \Rightarrow x = 0 \text{ ou } x = \pi \text{ ou } x = 2\pi$$

$$\cos x = \frac{1}{2} \Rightarrow x = \frac{\pi}{3} \text{ ou } x = \frac{5\pi}{3}$$

$$0 + \pi + \frac{\pi}{3} + \frac{5\pi}{3} + 2\pi = 5\pi$$

20 Letra A.

$$(\sin^2 x)^2 = 1 + \cos^2 x$$

$$(1 - \cos^2 x)^2 = 1 + \cos^2 x$$

$$1 - 2\cos^2 x + \cos^4 x = 1 + \cos^2 x$$

$$\cos^4 x - 3\cos^2 x = 0$$

$$\cos^2 x \cdot (\cos^2 x - 3) = 0$$

$$\cos^2 x = 0 \Rightarrow \cos x = 0 \Rightarrow x = \frac{\pi}{2} \text{ ou } x = \frac{3\pi}{2}$$

$$\cos^2 x = 3 \Rightarrow \emptyset$$